CEMENT MILL SECTION of

Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of portland cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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CONTENTS

Shipping Loaded Trucks and Trailers on Railway Freight Cars *(Illus.)* 35
Complete report on subject suggests possibilities of truck ferry service in cement industry.

The Cement Industry of New York State from 1902 to 1932 *(Illus.)* 38
Another article by Edwin C. Eckel, pointing out low production per capita in eastern state.

Prospects Good as Plants Reopen in November 41

British Cement Imports Curbed by Customs Order 41

Association's Thirtieth Anniversary Strikes Aggressive Note 42
A report of what happened at the recent Portland Cement Association meeting in Chicago.

Editorial 43
How Can We Afford to Modernize?
How Gasoline Tax Funds Are Mortgaged.
A Thorough Plant Survey.

New Special Cement Entering Secondary Road Market *(Illus.)* 44
Further information on Medusa's new temperature resisting cement.

Cement Statistics for October *(Illus.)* 46

Mill Equipment *(Illus.)* 47

About the Manufacturers of Equipment 48

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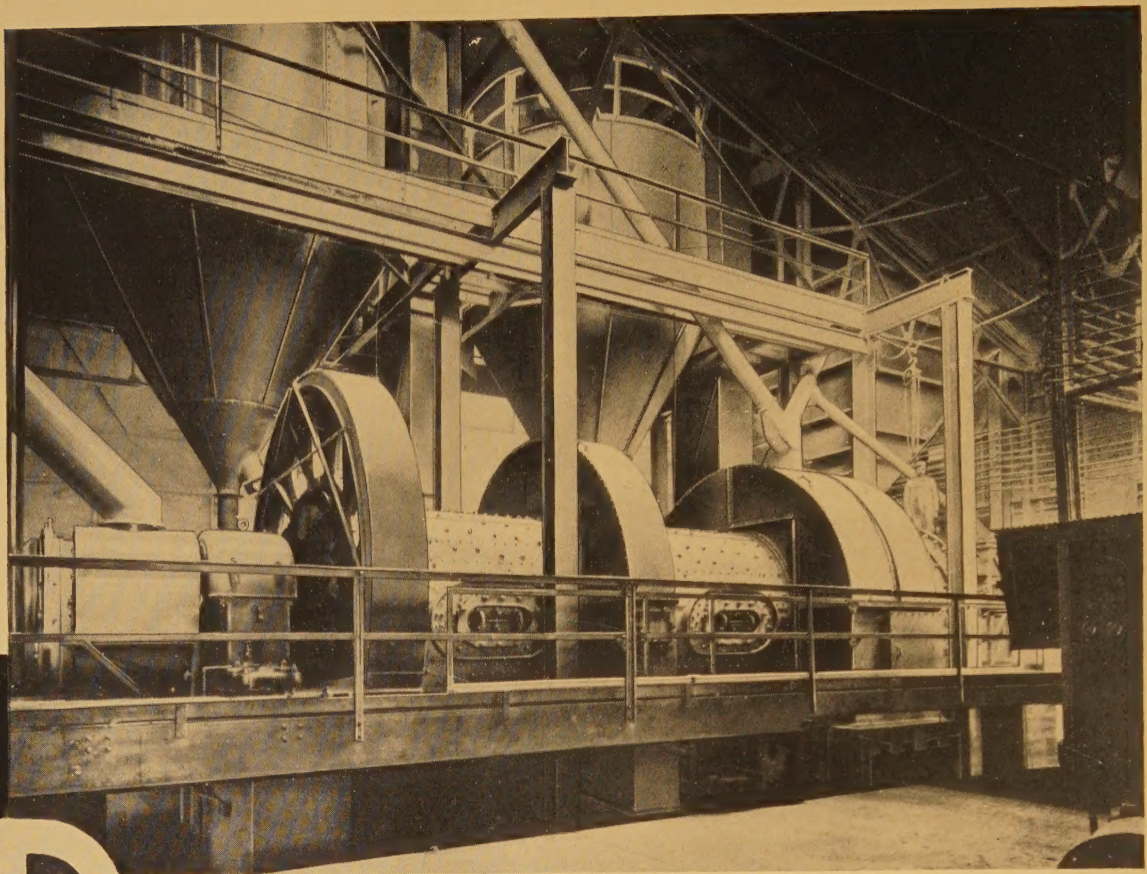
INDEX TO ADVERTISEMENTS

Allis-Chalmers Co. 34
Engineering & Designing 30
General Motors Truck Co. Back Cover
Kritzer Co., The 30



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Shipping Loaded Trucks and Trailers on Railway Freight Cars

Truck Ferry Service Inaugurated by Railroad Between Chicago and St. Louis Suggests Possibilities for Cement Industry—How Service Might Be Applied to Either Bulk or Sacked Cement—Some Modification of Present Set-Up Necessary

On October 18 the Alton Railroad Company, formerly the Chicago & Alton, inaugurated a service between Chicago and East St. Louis whereby loaded trucks and trailers are carried between the two cities on railway flat cars or drop-end gondolas.

While the territory traversed by this particular railroad is such that little use of the service can be made by the portland cement industry, it is well known that freight traffic managers of other railroads are watching the experiment and studying its possibilities.

Where the Possibilities Lie

It is probable that, so far as the shipment of cement is concerned, the greatest possibilities for a service of this character will be found in shipments direct from mills into territory not having cement mills near at hand and not served by convenient water transportation.

Likewise, it is probable that even in such territory the best prospect for the use of this new service, so far as cement is concerned, will be the large construction project that is not reached by railway sidings. In a word, any large construction project located in such territory that requires truck-hauling of cement will be a potential user of a shipping service of this kind. Construction work coming under this category includes concrete highway work, large dams, important bridges, and buildings in large cities when such buildings are not served by railroad sidings and no cement plants are located within convenient trucking distance.

Nature of the Service

The possible application of this shipping service to the cement industry will be understood to the best advantage after a study of the service actually inaugurated at the present time.

To begin with, the shipper owns the trucks and trailers, and they must be loaded on the freight car by the shipper or his agent, under the trucks' own power. Similarly, the consignee or his agent must unload the trucks and trailers from the cars at destination. The railway company supplies docks or ramps for the loading and unloading operations, for the use of which no charge is made.

The cars supplied by the railway company may be either flat cars or drop-end gondolas. The only loading service rendered by the railway company is that incident to the blocking and anchoring of the trucks and trailers to the railway cars. For this purpose the truck or trailer must have an anchor hook firmly secured to it at each corner—four hooks in all. By means of these anchor hooks the railway company anchors the motor vehicle securely to the floor of the freight car, with convenient special equipment devised for the purpose, and the wheels are blocked.

The trucks and trailers must be equipped with closed sides and closed end doors, and such doors must be tightly fitting and have suitable locking and sealing devices. The shipper must provide adequate locks or seals with which the door may be secured and the lading protected. Locks placed by the shipper are removed by the consignee, who assumes responsibility for their return. Trucks or trailers with open sides or open top will not be accepted for shipment. Maximum weight and outside dimensions of trucks or trailers, including their contents, must comply with the figures in Table 1.

TABLE 1

Maximum Weight and Outside Dimensions of Trucks or Trailers, Including Contents

Maximum width of truck or trailer body	8 ft. 6 in.
Maximum length	34 ft.
Tread (outside wall to outside wall of tires)	8 ft. 6 in.
Height (bottom of tire to top of truck or trailer)	11 ft. 6 in.
Maximum weight of truck or trailer, including contents—	
When length is 22 ft. or less	36,000 lb.
When length is more than 22 ft.	40,000 lb.

Freight Charges

The freight charges are as given in Table 2. The schedules here established cover only the complete haul of 278 miles from the Harrison Street yard in Chicago to the team track yard of the Alton Railroad in East St. Louis. It will be seen that the freight charges are based on the length of the motor vehicle, rather than on the weight of the vehicle and its contents, although the total weight is limited, as indicated in Table 1. The width is limited to 8 ft. 6 in., as shown in Table 1, although some state highway regulations limit the width to 7 ft. 6 in.

TABLE 2

Freight Charges Between Chicago and East St. Louis for Loaded and Empty Trucks and Trailers

	Freight Charge	
Length of Truck or Trailer	Loaded	Return (Empty)
Under 20 ft. in length	$30.00	$15.00
Length from 20 ft. to 21 ft. 11 in., inclusive	35.00	17.50
Length from 22 ft. to 23 ft. 11 in., inclusive	40.00	20.00
Length from 24 ft. to 29 ft. 11 in., inclusive	50.00	25.00
Length from 30 to 34 ft., inclusive	60.00	30.00

In the case of a commercial trucking concern, the charge for the return of empty motor vehicles is of little importance, since good management will see to it that trucks and trailers carry cargoes of their own in each direction. In the case of cement, where it is shipped from the mill to a distant construction project in trucks or trailers owned by the cement company, there is but little opportunity to pick up a cargo on the return trip. In consequence, the "return empty" charge becomes an important factor, as will be shown.

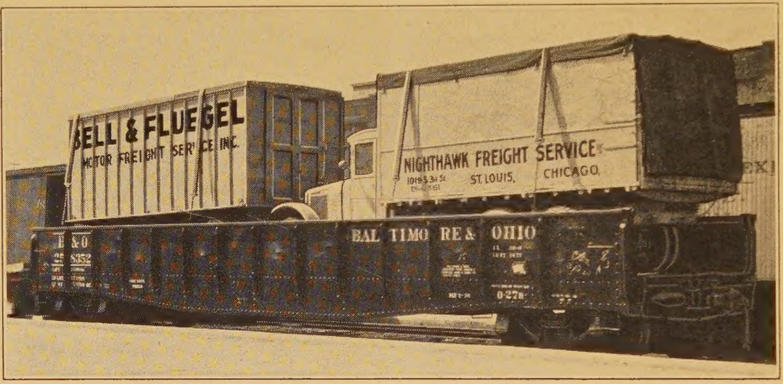
Application to Shipment of Cement

In the short time since the inauguration of this truck ferry service, as it is called in railway parlance, no cement has been offered for shipment, though it would be accepted if offered in motor vehicles meeting the requirements. Morover, if a shipper anywhere along the line of the Alton Railroad wished to utilize a similar service for shipping to any other point along the line, he could doubtless obtain the service if he had a sufficient volume of freight to be attractive.

Possible Set-Up for Shipping Cement

Cement is a relatively heavy product, so that a truck or trailer falling well within the dimension limits given in Table 2 could carry enough cement to bring the load up to the total weight permitted in Table 1.

Any plan looking toward the utilization of this character of service for the shipment of cement, however, should take account of the fact that for every pound of reduction in the weight of the vehicle an additional pound of cement can be shipped, without adding to the freight charge. This suggests at once that the logical arrangement for shipping cement is to ship it *in trailers only*.



Drop-end gondola transporting motor trucks loaded with merchandise

The exclusive use of trailers can be justified further, from a consideration of the actual operation of the plan as it might be applied to the shipment of cement from the mill to the construction project. To begin with, the cement company would own the specially built equipment, whether trucks or trailers. It would be impracticable and undesirable from the standpoint of the cement company to entrust the operation and return of its trucks to the contractor's forces. The handling of trailers, however, might safely be so entrusted, so that another argument is supplied in favor of employing trailers only.

Actual Operation of Plan

The actual operation of the plan would, therefore, require the cement company to load the trailers on to the flat cars or gondolas at the cement mill, using any of its service trucks to bring the trailers into position to be drawn up on to the car by means of a windlass or similar device. Or, better still, instead of using a ramp for loading, the cement mill might provide a platform at the level of the car floor so as to simplify the operation of loading. At destination the contractor would in turn use his regular service trucks to unload the trailers, haul them to the construction project, and return them to the freight cars to be shipped back to the cement mill as "empties."

Trailers used for the shipment of sacked cement would require no special equipment in their construction. The body might be analogous to a box car. Trailers used for shipping cement in bulk would, of course, require special attention to their design and equipment. They might be analogous, on a small scale, to the railway hopper cars employed in shipping bulk cement, described in an article in the Cement Mill Edition of CONCRETE, July, 1932, pages 34-35, and in the regular edition of October, 1932, page 18. In either case the trailer should be of the lightest possible type of construction consistent with the requirements for strength. For this purpose it is suggested that special material, such as ply metal, might well be employed, because of its light weight and great strength.

Cost of Shipping Cement

Keeping in mind the limitations on weight and dimensions established in Tables 1 and 2, it will now be possible to determine the cost of shipping cement in trailers transported on railway cars. Only the actual shipping charges will be considered, no account being taken here of the cost of the trailers, their depreciation, or the interest on the investment in them.

In considering the trailer itself, consideration must be taken of matters such as maximum width, maximum axle load, maximum wheel load per inch width of tire, maximum total length of truck and trailer, and various other restrictions imposed by state laws on motor vehicles using state highways. These regulations differ in different states, so that trailers used by any given cement plant would of necessity have to be designed so as to comply with the regulations enforced in the several states within the shipping area.

Size of Trailer

Because of the heaviness of cement, a hopper trailer with a body 90 in. wide, 90 in. high and 10 ft. long would be large enough to carry somewhat in excess of 15 tons of cement. A box-car type of trailer body for shipping sacked cement would not need to exceed 7½ or 8 ft. in length. The cargo space would be well in excess of 300 cu. ft. in either case. By using ply metal and providing the body with a rigid frame of light-weight metal of great strength, it is believed that the weight of the trailer would not exceed 6,000 lb. This would permit a cargo of 30,000 lb. of cement without exceeding the maximum total weight of 36,000 lb. specified in Table 1.

This total weight of 36,000 lb. would mean an axle load of 18,000 lb., which would probably cause no difficulty. In various states the permissible axle load ranges from 12,000 to 22,000 lb. Dual wheels would be necessary, in order to provide the tire width required by most states.

Referring now to Table 2, it will be seen that the charge for hauling this trailer a distance equivalent to that from

Chicago to East St. Louis (278 miles), would be $30.00, or exactly $2.00 per ton for the 15 tons (30,000 lb.) of cement carried by the trailer. The regular freight charge on cement from Chicago to St. Louis is 15½ cents per hundred, or $3.10 per ton.

Difficulty Lies in Return of "Empties"

Shipment in loaded trailers would, therefore, be highly satisfactory if some way could be found to load the trailer on the return trip. However, assuming that a carload consisting of three loaded trailers were forwarded to the shipping point nearest the construction project, it is highly improbable that a return cargo of any kind could be obtained for trailers owned by the cement company. If the trailers were returned on the "return empty" rate of $15.00 each, the total charge for the round trip would be $45.00 per trailer, or $3.00 per ton of cement, practically the same as the regular charge of $3.10. No advantage would, therefore, be gained so far as freight charges are concerned. The contractor would gain the advantage of receiving the cement in a form convenient to handle from the railroad to the construction project, but that is all.

The suggestion has been made to the writer that the three empty trailers in the case assumed could be hooked on to a privately owned loaded truck carrying some other product back in the direction of the cement mill, and that in this manner the empties could be returned to the cement mill at a cost considerably below the cost of returning them on railway flat cars. The natural reaction to this suggestion is that the independent truck operator might as well be employed also to transport the loaded trailers from the cement mill to the construction job. Or, for that matter, the cement mill management might use its own service trucks and its own truck drivers to transport the loaded and empty trailers to and from the construction project. This suggestion, then, favors the ownership and use by the cement company of specially built trailers, but it leads right back to highway transportation for the entire distance and leaves the railroad out of the picture.

Two Possible Solutions

Two possible solutions are here presented as ways in which railway truck ferry service might be employed with profit by the cement industry.

The first solution requires that the specially built gravity-unloading hopper trailers be owned and operated by an independent trucking company, which would transport the output of the cement mill under contract. An independent trucking company could transport not only cement, but lime, fertilizer and various other chemical products—in fact, any dry powdered or granular material. Consequently the independent trucking company, after delivering the cement, could utilize the trailers in transporting other commodities on the return trip. The cement manufacturing company, on its part, would avoid the necessity of making a capital investment in the trailers.

The second solution is seen in the fact that a cement-carrying hopper trailer capable of holding 15 tons of cement would not exceed 10 ft. in length, so that a 36-ft. or 40-ft. freight car would have more than enough space for three trailers. The total weight would be 54 tons.

Reference to Table 2, however, discloses that no distinction is made in the freight charge between a truck or trailer 20 ft. long and one only 10 ft. long. Consider the case of a 20-ft. trailer having a loaded weight of 36,000 lb. The railroad company could transport only two such trailers on a 40-ft. flat car, and the freight revenue would be $60.00 on the outgoing trip and $30.00 for the return of the two empty trailers, or a total revenue of $90.00 for the round trip for a distance equivalent to the distance from Chicago to East St. Louis.

Suppose, now, that for the 10-ft. trailers the railroad company were to establish a rate of $20.00 per trailer, loaded, and half that amount for the "return empty" rate, for the distance equivalent to that between Chicago and East St. Louis. The revenue coming to the railroad company would again be $60.00 on the outgoing trip with the loaded trailers and $30.00 on the return trip with the three empty trailers, bringing the total revenue for the round trip up to $90.00, as before.

Comparative Cost

Under these conditions the total cost of transporting the 45 tons of cement for this distance, and returning the empty trailers to the cement mill, would be $2.00 per ton of cement (about 38 cents per barrel), compared with the regular charge of $3.10 per ton, or about 59 cents per barrel.

Many an instance might arise where a large order would go to the cement mill equipped to give the contractor a considerable part of this advantage of 21 cents per barrel, and the further advantage of receiving his cement in bulk. The plan contains possibilities for the industry, the full advantages of which can only be determined in individual cases through consultation and co-operation between officials of the cement plant and railway traffic managers of the railroads concerned.

Affleck Foresees Slow, Steady Increase in Volume

Points Out Factors Favorable to Future of Industry

A slow, steady movement away from the low point of the depression to a more prosperous ground is looked for in the cement industry by B. F. Affleck, president of the Universal Atlas Cement Company, according to Philip Hampson in the *Chicago Tribune* of November 12.

Because of the present picture in the building industry, Mr. Affleck does not look for any spectacular rise. Rather, he says, if the cement industry increases its volume 5 per cent or more each year during the next few years it will do well.

On the other hand, Mr. Affleck finds a number of factors favorable to the industry, as follows:

1. Present prices are more nearly stabilized than they have been for a long time.
2. Highway construction.
3. Fast rising obsolescence in buildings which will demand either replacement or improvement.
4. Increasing demand on the part of the public for fireproof construction both in private and public buildings.
5. The present doubling up of families which, when times become more normal, will demand construction to provide for their housing needs.

Cement Industry of New York State from 1902 to 1930

State's Percentage of Total Cement Output Much Below Percentage of Population—Troubles of Steel Industry May Decide Location of New Plants

By **EDWIN C. ECKEL**
Consulting Geologist, Washington, D. C.

THE present paper is in some sense written as a companion to that on the cement industry of California, published in the October Cement Mill Edition of CONCRETE. It has the additional value of furnishing a comparative study of these two great states, both promising greater future growth than the average of our territory. And to me it is of some personal interest, as involving a return to the field covered by my very first official cement report, at a time when American portland cement was still struggling for recognition from American architects and engineers. The final reason for this return to an old subject is that one of my occupations of the year has been the preparation of an industrial history of New York for official publication, and the past and future of our cement industry have had to be re-studied and considered from a rather broad viewpoint—that of maximum public utility under possible future conditions as to transport and power.

Location of Existing New York Cement Mills

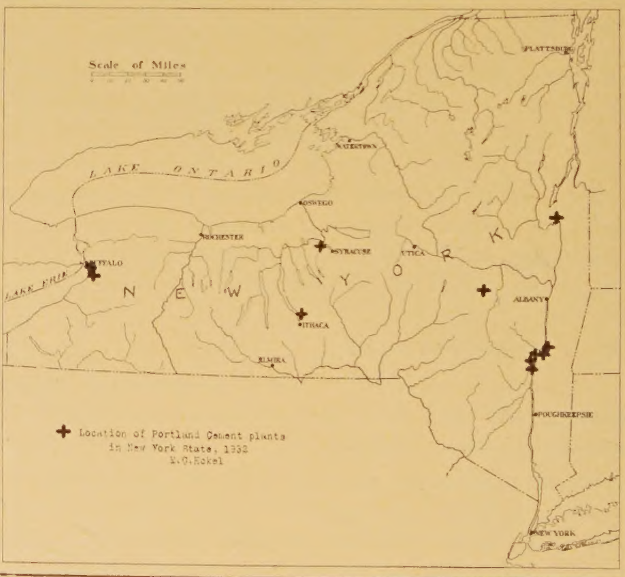
In order to make the comparison with California conditions as clear as possible, it will be well to follow out exactly the same order as that used in presenting the California cement data in October.

Portland cement was first made in New York as early as 1875, in an experimental mill near Kingston, and by 1883 there was an actual operating mill at South Rondout. In 1889 the first rotary kiln successfully operated in America was at Rondout, while a little later Spencer Newberry ran the first wet mixes in a rotary at Montezuma. All this is merely historic background now, for none of these early attempts have left successors on their exact sites today. Our oldest actively operated locality and company is, I think, that of Glens Falls, which began shipping in 1893 or so, and has remained in steady operation for 40 years, using essentially the same raw materials throughout, but advancing steadily in technique until now it is one of the progressive group which specializes on high-speed cement.

From that date (1892-3) onward there were a dozen or more cement mills built at widely scattered localities, all of which, except the few which operated marl deposits, being still represented by modern cement mills. Because of this occupation of old sites by new mills and companies I am not giving a list of the original plants in order of date, but have located the eleven which are now in operation on the accompanying map, the base for which is one of those prepared for the use of the New York State Museum.

It will be seen that these eleven mills occur as two close groups, plus four mills at scattered localities. The groups are the five mills along the middle Hudson in the general Hudson-Catskill region; and the two mills in and near Buffalo. The isolated mills are those near Ithaca, Syracuse, at Howes Cave and at Glens Falls.

As to ownership we may say that the eleven mills represent eight different ownerships. Of these eight, all except two also own other cement mills in other states. It is of interest to note that all except one of our five leading cement corporations are represented by New York mills—several by two such mills. This suggests that the real manufacturing and distributing advantages of New York are finally clearly recognized by the portland cement industry, as they have been by general manufacturers for more than a hundred years; for ever since 1820 New York has been the leading manufacturing state, a position based not on local fuel supplies but on its unequalled transport position.



Cement plants in the state of New York in 1932

Locations of Abandoned Mills

Some light is thrown on the profitable manufacturing centers if we consider the four or five mills which have died out completely in the last three decades. Of these, two were located in the southern tier, at Wayland, in Steuben county. Both were wet process fixed kiln mills, built very early, to utilize small marl deposits in the vicinity. So far as can be seen there was no other reason, so far as transport or markets were concerned, for any mill to be built in that region; so as soon as the marl supply ended the area was abandoned as a cement making center. Of the other early mills which died out without leaving any direct or immediate successor on the same spot, one was the early mill on the Hudson near Kingston; after a long time gap its place was taken by the group now existing, all located on the same limestone formations but some miles farther north. Two wet process mills built to work marl deposits in central New York also died many years ago. Their field is occupied approximately by the Alpha mill at Jamesville, which, however, uses limestone in place of marl. From this summary of the matter, it can be seen that in all except one instance the dead mills were killed off by the slow disappearance of their raw material supplies, that in two cases the location was unattractive except for the marl, and that in the other cases we have now limestone—using mills of far greater output occupying, not the same sites, but the same market region.

Relative Growths of Cement Output; New York and United States

The growth in portland cement output during the past 30 years is stated in Table 1 for both the United States and for New York State individually.

TABLE I. PORTLAND CEMENT PRODUCTION, UNITED STATES AND NEW YORK, 1901-1930.

Year	Total U. S., Barrels	N. Y. State, Barrels	Percentage of U. S. Output in N. Y. State
1901	12,711,225	617,228	4.9
1902	17,230,644	1,156,807	6.7
1903	22,342,973	1,602,946	6.9
1908	51,072,612	1,988,874	3.9
1909	64,991,431	2,139,884	3.3
1910	76,549,951	3,296,350	4.3
1911	78,528,637	3,314,217	4.2
1920	100,023,245	5,885,058	5.9
1921	98,842,049	5,294,188	5.3
1922	114,789,984	5,922,706	5.1
1923	137,460,238	6,990,174	5.1
1924	149,358,109	7,571,856	5.1
1925	161,658,901	8,769,584	5.4
1926	164,530,170	8,795,768	5.4
1927	173,206,513	10,775,375	6.2
1928	176,298,846	10,960,204	6.2
1929	170,646,037	10,761,368	6.0
1930	161,197,228	10,372,742	7.4

Table 1 brings out clearly certain features of the growth of the New York cement industry which are apt to be overlooked in any shorter view. One is that New York 30 years ago was already the center of a very promising portland cement development, and was producing proportionately to the rest of the United States just about as much as in very recent years. The second fact, important to all interested in the development of New York State, is that this relatively high rank was lost, and that for more than a decade New York lost ground in its relative percentage of the total national output.

Effect of Overbuilt Lehigh District

We know, of course, that this retrogression was not due to lack of raw materials or of good markets, but to deliberate and stupid attempts to bolster up the status of the Lehigh district, already hopelessly overbuilt so far as its own natural markets were concerned, and therefore necessarily intent on shipping to markets outside its own natural field. That performance lasted at its worst for a decade; the tendency has reappeared at intervals since; at the moment, with practically all the larger companies represented by New York mills, the situation is probably reasonably fair.

In this respect the early overbuilding of the Lehigh district has weighed on the American portland cement industry, both financially and mentally, much as the steel-capacity overload of the Pittsburgh region weighed on the development of our steel centers elsewhere. It is to be hoped that in future less time will be wasted in attempts to delay natural developments; they merely put off the evil day and then leave over-large bond issues to be cleared up by the patient receivers.

In the case of New York the first break in the concert occurred around 1909-1911, when Knickerbocker was built by an independent banking house and Atlas acquired the older Hudson mill for its individual account, action which resulted in disruption of the first eastern community of interests. In later years the growth of the New York industry has followed more rational lines, and today it has somewhat more than regained its relative rank of 30 years ago. It is not yet, as will be seen in our next comparison, developed to the capacity justified by the population of the state, a situation which will undoubtedly receive attention in the near future.

Growth of Population, 1890-1930

New York has not in the past hundred years or so shown any such spectacular *rate* of population increase as was shown by California in recent decades, but it has maintained its rank as the leading American state continuously since it first attained that rank in 1820. The facts as to relative growth during the past 40 years are summarized in Table 2, in which the United States, New York and California are compared.

If we consider the growth of New York broadly, it is close to the truth to say that its relative status dropped slightly and slowly from around 1830 to around 1890, when it reached a temporary minimum, but that since the nineties the state is slowly becoming of greater relative importance again. In the last census it accounted for more than one-tenth of the total United States population, the highest ratio it has reached for very many decades.

TABLE II. POPULATION GROWTH, UNITED STATES, NEW YORK, CALIFORNIA, 1890-1930.

Year	Continental U. S.	N. Y. State	Percentage of Total	California	Percentage of Total
1890	62,947,714	6,003,174	9.6	1,213,398	1.9
1900	75,995,575	7,268,894	9.6	1,485,053	1.9
1910	91,972,266	9,113,614	9.9	2,377,549	2.6
1920	105,710,620	10,385,227	9.8	3,426,861	3.2
1930	122,775,046	12,588,066	10.3	5,677,251	4.6

Inspection of Table 2 shows that though New York State has not in recent decades shown the spectacular rates of increase reported by California, it has nevertheless grown more rapidly than the average of the United States.

There is no reason to assume that this status will be affected adversely in the near future, while there are, on the other hand, some reasons for thinking that in coming years New York will gain in population faster than its nearest neighbors.

Such gains are likely to appear more notably along its Lake and Niagara frontiers than in other sections, if our present knowledge of raw material and power supplies can be used as a basis for predictions as to future growth. That development is likely to be in part at the expense of Pennsylvania, whose manufacturing rank seems likely to fall off slowly along with the decrease in relative importance of the Pittsburgh steel center.

Cement Output per Capita

In Table 3 I have tabulated the cement output per capita of New York State for the last four decades, placed in comparison with the per capita outputs of California and of the entire United States.

TABLE III. CEMENT PRODUCTION PER CAPITA, UNITED STATES, NEW YORK, CALIFORNIA

Year	Average U. S. Output, Bbl. Per Capita	N. Y. Output, Bbl. Per Capita	Calif. Output, Bbl. Per Capita
1890	0.0053	——	0.0
1900	0.112	0.9	0.16
1910	0.832	0.35	2.3
1920	0.943	0.56	2.1
1930	1.31	0.82	1.8

This relatively low output per capita in New York State merely emphasizes the fact that, looked at merely as a New York industrial problem, the state is still very far from being overbuilt with cement capacity. That situation will inevitably be brought to attention as soon as commodity consumption turns upward again, and will just as inevitably lead to the erection of new cement plants at various points which now seem to be specially attractive.

A rich state with ample supplies of cheap power, iron ores and limestones already in state control, is not likely to lag behind in its industrial development merely to suit the financial needs of some other region in another state; and I assume that this fact is so obvious that it does not need to be stressed here. As to how far such state interest in mineral development may wisely be carried, that is a matter for consideration elsewhere; what everyone should bear in mind now is that the interest exists, and that in the years to come it is likely to be manifested in many lines which, at earlier periods of our national development, would have seemed incredible. The wisest attitude for existing industrialists to assume is, probably, that there will in any case be a number of new cement mills in New York State, and that the real question is who is to build and operate them.

Factors Influencing New Plant Locations

With regard to the probable locations of such future cement plants, one might hazard a guess with little chance of going far wrong, since existing conditions limit the possibilities and emphasize those which remain open. So I would say that, as business recommences growth, two general regions will be pushed forward as possible sites because of conditions within the cement industry, while another locality, or group of localities, will take up cement manufacture because of conditions in a closely related industry.

The two areas which should interest cement producers *per se* are the Rochester region, where a good manufacturing region, well supplied with fuel and power, will be found difficult though feasible with regard to raw material supplies. The second area, interesting because of its excellent limestones and its relations to the St. Lawrence canal, is of course along the New York shore of that river.

Aside from these two obvious areas of cement interest, there is a third certainty, or rather group of certainties, which is becoming an economic necessity; and that fact might profitably be recognized by cement manufacturers not only in New York, but elsewhere. It arises from the thoroughly desperate condition of some units in the American (and foreign) steel industry, which are now facing a future in which 50 per cent of capacity may be maximum operations for a decade. That is due to careless overbuilding during our period of imaginary post-war prosperity, and it has left many steel companies with certain plants which they can not possibly hope to operate full under any conceivable conditions; and financially overloaded with bond issues which bear very heavily when mills are operating at low rates. There are only two ways out of this condition, and I believe that the intelligence of the average steel producer will put both into practice rapidly. One, of course, is to turn more heavily into the higher-grade products, yielding better profits per ton and therefore better suited to low rates of operation. The other, interesting in our present connection, is to use all the blast-furnace (and some special open-hearth) slag as cement material, thus cutting down sharply the overhead costs per ton of total products made. An additional incentive in that direction will be the fact that as the better lake ores disappear from the market in the next decade or so, furnaces now using these ores have an additional reason for cutting down bond issues and overhead, or for spreading those costs over a wider list of products. And this last incentive, be it noted, is not one of the very far distant future; most of those who read these words will certainly live to see lake furnaces fed with Swedish or Newfoundland ores arriving on the St. Lawrence route, and used in competition or to eke out the dwindling and carefully rationed supplies of our own lake ores.

Steel Interests to Make More Cement

So, whether the existing cement industry likes it or not, we may as well prepare to see the entry into large-scale cement manufacture of all the larger, and some of the smaller, iron and steel interests. That will temporarily enlarge the number not only of cement plants but of cement companies or interests. I say *temporarily*, because unless all past history is worthless as a guide, one of the surest things in the coming decade will be the rapid series of regroupings and consolidations in all of our manufacturing industries. That process will be forced by conditions, and will probably meet with public approval rather than reprobation or criticism.

My reasons for anticipating further cement growth in New York State range, therefore, from the existence of attractive markets, plant locations and raw materials to the existence of a technical and industrial crisis in a related industry. I have noted all these factors with more freedom than would be possible if my readers were less keenly interested in the cement industry already. What I have said as to the future of the American steel industry should not be understood as doubting its possibilities, within a reasonable period, of making and marketing increased *total* output; it refers to mills located at points where ore supplies or foreign competition will prevent maximum output even during boom periods. In the existing economic situation some steel companies have had to carry charges on more than $300 of total capitalization per ton of steel sold. It is obvious that no treasury can stand that very long, and that the only way out is to spread that load over a broader base. That in turn will affect the cement industry in several ways. It might be added, perhaps, that some of the less fortunate cement companies might learn useful lessons from the steel difficulty and its possible solutions.

Prospects Good as Plants Reopen in November

Universal Atlas, Lehigh and Ash Grove Plants Among Those to Resume

Four Universal Atlas and Lehigh plants were among those to reopen in the last month.

Shut down since April, the Universal Atlas plant at Indiana Harbor, Ind., resumed operations on November 1. While official announcement stated approximately 150 men would be recalled, it was learned nearly half the normal force of 1,200 workers has been recalled, according to newspaper reports. Publicity was believed withheld as a precaution against an influx of unemployed men.

Production is under way at about 40 per cent of capacity and orders are on hand to carry it well into the Winter, it was stated by J. H. Kempster, general superintendent.

The Hannibal, Mo., plant of the Universal Atlas company was also reported as reopened early in November.

The Lehigh plant at New Castle, Pa., resumed temporarily November 5, with 200 men, after having been closed for several months. Another two hundred men were called back at the Oglesby, Ill., mill, early in November, for the first time in 9 months. Continued operation through the major part of the winter is contemplated at the Mitchell, Ind., plant, where a reduced operating basis was put into effect the first of November in an effort to keep the plant running as long as possible. Highway construction being possible, it was expected that such demand would consume large shipments through November.

The Kansas plant of the Ash Grove company re-employed 100 men with the opening of the plant for the first time since February.

British Cement Imports Curbed by Customs Order

Washington Hearing Results in "Suspension of Dumping Order"; Ferrocrete Company Head Makes Counter Charge

Announcement that a "suspension of dumping order" has been issued against imports of British cements is reported to have been made by the customs bureau on November 12, at Washington. As a result, the importer will be required to post a bond equivalent to the value of the shipment, to be forfeited if dumping is later proved.

The action is said to have been taken on a report of the New York customs appraiser who said he believed the situation required a general investigation.

At the hearing held on October 21, before Commissioner F. X. A. Elbe, cement manufacturers' representatives charged that the price consideration was such as to "break the market" to a point where they could not compete and were threatened with the loss of the seaboard market.

Among those who testified were Jas. Ackerman, New York, assistant to the president, Lawrence Portland Cement Co.; John Bowen, vice-president, Lehigh; and C. C. Long, secretary, Lehigh company.

Albert M. Barnes, domestic producers' attorney, further indicated that the complaint was not so much with relation to the amount of importations, which so far is not large, as it is to the low price of the foreign product. He claimed also that the British importations, selling at 30 cents less than the native product, have broken up the Newark, N. J., market, and effect on the New York market is feared.

Barnes asserted the cost of producing British cement in London is 40 cents a barrel, while labor cost alone in the United States is 37 cents. He said that shipments of British cement to the United States began following the depreciation of the pound sterling when Great Britain abandoned the gold standard.

In an application filed as the first step in a counter-offensive, E. Rand Hollander, president of the Ferrocrete Cement Company, charged domestic producers with using misleading tactics in their fight to bar British imports, according to the *New York Journal of Commerce*.

Mr. Hollander, in a statement issued on November 2, is understood to have asserted that misleading testimony was submitted at the hearing on October 20.

In challenging the statement that the slight price difference in favor of the British product is such as to break the market to a point where domestic makers cannot compete, Mr. Hollander pointed out that the price of two well-known brands of American cement have been marketed openly in the seaboard territory at prices 15 and 17 cents below the price fixed by the other fifteen or sixteen mills supplying the area.

Mississippi Valley Association Meets at St. Louis

The fourteenth annual convention of the Mississippi Valley Association, St. Louis, Mo., was held in the Statler Hotel in that city on November 21 and 22.

This organization is devoted to the development of inland waterways and the development of barge transportation for the utilization of such waterways.

Aetna Marl Purchase

Marl deposits located on Silver Lake, Mich., have been purchased recently by the Aetna Portland Cement Co., Detroit.

Association's Thirtieth Anniversary Strikes Aggressive Note

Chicago Meeting Lays Plans for Active Campaign — Sewage Treatment Plants and Roads Shown as Great Possibilities for Market Development — Discuss Effect of Vibration on Quality of Concrete

THE thirtieth anniversary meeting of the Portland Cement Association, held at the Blackstone Hotel, in Chicago, on November 14, 15, and 16, will long be remembered as the great occasion when the cement industry resumed the offensive.

With the belief prevailing that concrete highway construction will continue in considerable volume, that the rapidly rising obsolescence in buildings will demand improvement or replacement, that R. F. C. projects will be translated into actual cement requirements in 1933, and that undeveloped markets can and will be developed, the delegates to this year's annual meeting had something tangible back of their enthusiasm.

Going After New Markets

Two papers which aroused unusual interest were presented at one of the market promotion sessions of the meeting. One of these, presented by H. C. Delzell, sanitary engineer for the highways and municipal bureau of the Association, pointed out the market possibilities in the construction of needed sewage treatment plants made possible by the Federal Relief Act. The second paper, by J. R. Fairman, manager of the eastern offices of the Association, emphasized the possibilities lying in the revived interest in low-cost roads of the cement-bound macadam type.

The renewed interest in cement-bound macadam arises directly from the desire of highway engineers to provide durable, but low-cost, construction for secondary roads. The year just coming to a close saw the construction of a number of experimental roads of cement-bound macadam, ranging in length from a few hundred feet to more than a mile.

Vibrated concrete and the influence of vibration on quality was discussed and explained in a paper by F. R. McMillan, director of research.

Elect Conn and Block

Charles F. Conn, president of the Giant Portland Cement Co., of Philadelphia, and a leader in the cement industry for many years, was elected chairman of the board of directors. H. L. Block, president of the Missouri Portland Cement Co., of St. Louis, was elected treasurer of the Association and is also a director.

Other new directors are Charles Boettcher, president, Oklahoma Portland Cement Co., Denver; G. S. Brown, President, Alpha Portland Cement Co., Easton, Pa.; C. B. Condon, secretary and general manager, Hawkeye Portland Cement Co., Des Moines; Charles Horner, president, Kosmos Portland Cement Co., Louisville; J. B. John, president, Medusa Portland Cement Co., Cleveland; M. C. Monday, president, Hermitage Portland Cement Co., Knoxville; J. J. Porter, president, North American Cement Corp., New York; and J. S. Young, president, Lehigh Portland Cement Co., Allentown, Pa.

Hold-over directors are B. F. Affleck, president, Universal Atlas Cement Co., Chicago; George F. Coffin, secretary and treasurer, Nazareth Cement Co., Easton, Pa.; Charles L. Hogan, vice-president, International Cement Corp., New York; J. D. Johnson, president, Canada Cement Co., Ltd., Montreal; Morris Kind, president, Hercules Cement Corp., Philadelphia; E. P. Lucas, president, Superior Portland Cement, Inc., Seattle; Blaine S. Smith, president, Pennsylvania-Dixie Cement Corp., New York; L. T. Sunderland, president, Ash Grove Lime and Portland Cement Co., Kansas City; John Treanor, president, Riverside Cement Co., Los Angeles; C. E. Ulrickson, vice-president, Trinity Portland Cement Co., Dallas; E. J. Mehren, president, Portland Cement Association, and Wm. M. Kinney, vice-president and secretary of the Association.

The thirtieth anniversary of the Association was commemorated at a special dinner at which Robert W. Lesley, a founder of the Association and its first president, was a guest of honor.

South Dakota State Plant Operations Wipe Out Deficit

Business during the last quarter was good and is continuing so for the South Dakota state cement plant, according to its officials, who filed their regular quarterly report early in October.

Sales during July, August and September more than made up a deficit of about $24,000 for the first six months of the year. The plant is in full operation and will continue so indefinitely.

The quarterly report shows gross sales and some operating expenses but does not include a profit and loss statement or figures from which the profit for the period can be reckoned, it was added.

Alpha Dredge Burns

"The Blue Goose," a sand dredge belonging to the St. Louis plant of the Alpha Portland Cement Co., was burned to the water's edge by a fire of unknown origin on October 20.

The boat was docked and no one was aboard when the fire started. Jas. B. Key, plant superintendent, was unable to estimate the damage.

EDITORIAL

How Can We Afford to Modernize?

"HOW can we afford to modernize, in view of present production and price levels?" is a question that many a cement company executive is asking himself and his associates since the Robertson committee launched its industrial rehabilitation campaign.

The question is easy to ask, but hard to answer; yet certain outstanding facts bear directly on the problem and may supply the answer.

One of these facts is that manufacturers of cement mill machinery have made unusual advances in the development of cost-reducing equipment during the past few years.

Another undeniable fact is that this cost-reducing equipment can now be bought and installed at a cost far below normal.

A third fact is that under the present level of cement mill output, complete manufacturing units can be replaced by cost-reducing equipment without interfering with plant operation.

Even if one assumes that cement production in 1933 will exceed the output in 1932, the industry as a whole cannot hope to operate much above 40 per cent of capacity during the coming year. If profits are to be earned at present price levels, mills that are not already modernized cannot hope to share in those profits unless they become modernized.

Under the circumstances the most pertinent question—the one calling most urgently for an answer—is "How can we afford ***not*** to modernize?"

How Gasoline Tax Funds Are Mortgaged

THE cement industry stands in danger of losing a large annual tonnage in the highway construction market unless further legislative raids on gasoline tax funds can be effectively discouraged.

With the legislatures of 42 states going into session in January, and with relief legislation on the program in many cases, the menace to road-building money becomes rather obvious.

If the diversion of gasoline tax money for relief purposes were temporary in its effects it might not be a serious matter; but the manner in which the diversion is accomplished in some states will result in the crippling of highway construction progress for many years.

Illinois is one example. Late in November the state legislature passed the Meents bill, which authorizes counties to issue relief bonds payable out of the counties' share of the state gasoline tax receipts. Specifically, a county may issue 20-year bonds to the amount of six times that county's share of the gasoline tax in 1931.

In that year the state collected, in round numbers, 30 million dollars in gasoline tax, of which amount 10 million went back to the counties. If all the counties take advantage of the law they may issue a total of 60 million dollars in 20-year relief bonds. Bond retirement and interest will require a total repayment of about 90 million dollars over a period of 20 years, averaging 4½ million per year. In consequence, nearly half the counties' share of the gasoline tax will be required for purposes having nothing to do with road construction, not for one or two years, but for 20 years.

In the meantime some counties have diverted other parts of their gasoline tax money into relief channels, so that but little remains for the construction of county roads.

Unless the present legislative trend can be checked, highway construction funds will be seriously depleted for a long period of years.

The Portland Cement Association is co-operating with other organizations and is using all honorable means to convince legislative bodies of the injustice of drawing on this source of revenue alone for relief purposes. In addition, much more can be accomplished if individuals within the cement industry will exert their personal influence with their own state governor and members of the legislature.

A Thorough Plant Survey

THERE may be several reasons why an individual cement plant continues to operate with obsolete equipment that holds production costs at high levels.

Perhaps the most obvious reason at present is the weakness of the cash position of some companies and the seeming inability to obtain credit for capital investment. Another reason may be reluctance to spend money in bad times.

Beyond these few reasons, and of far greater importance, it is not improbable that the real reason will be found—the failure of the management to realize the full extent of the waste due to obsolescence.

The plant manager may be too close to the operations to realize that certain equipment installed five years ago, which was then thought to be the last word in efficiency, is now completely out-classed by more recent designs.

Or, if the plant manager sees the situation, he may be unable to convince the board of directors.

Only a thorough plant survey will disclose all the points where money is being wasted by obsolete equipment.

Medusa's New Special Cement Enters Secondary Road Market

Product Is Portland Cement in Combination with Bitumen—One Favored Construction Method—Other Cement Manufacturers Will Be Granted Licenses

A NEW product that may place the portland cement industry in a position to gain a much larger portion of sales from the secondary highway and resurfacing fields than it now obtains, is seen in the new temperature-resisting cement now being produced at three of the plants of the Medusa Portland Cement Company.

The American rights to manufacture and sell this temperature-resisting cement, which was developed in Germany by Dr. Albert Sommer, have been acquired by the Medusa company, and for the purpose of conducting this business a subsidiary company has been organized under the name of the T. R. C. Corporation (Temperature Resisting Cement Corporation). The T. R. C. Corporation will grant licenses to other portland cement manufacturers.

Character of the Product

The new product is essentially a portland cement in combination with bitumen. The mixture was found to possess unusual properties. The setting process is slower than where ordinary portland cement is used, so that when used in road construction the material can be rolled to the utmost degree of compactness without interference with the set. In addition, the mixture of portland cement and bitumen was found to be highly waterproof, and it was unaffected by wide changes in temperature either during or after the setting period.

Wisconsin Highway Department building 1 1/3-mile stretch of cement-bound macadam road near Cedarburg. Heavy trucks running on road immediately after its completion

Placed as Cement-Bound Macadam

The method of construction of highways in which this temperature-resisting cement is employed was fully developed by Dr. Sommer in Europe, more than 200 miles of road having been placed in various countries. Similar methods have been employed in a number of experimental roads constructed in this country, one favored construction procedure being as described by U. J. Eckman, district superintendent of the Pennsylvania Department of Highways, in an article on page 8 of the November issue of CONCRETE.

From Mr. Eckman's article it will be seen the term "cement-bound macadam" constitutes a logical description of the type of road construction in which this cement is employed. First, a mortar of this special cement and sand is placed to a depth of about half the finished depth of the completed construction. A layer of broken stone of the type used for ordinary water-bound macadam is then placed on the mortar, to a loose depth of about 20 per cent more than the finished thickness of the completed work. The loose stone is then rolled firmly into the bed of mortar, by means of a 10-ton roller, until the layer has been compressed to the finished thickness. By this time some of the mortar has been forced up to the surface. A thin course of chips is then spread over the surface, and is rolled, thus completing the keying. Another thin coating of mortar, mixed in an auxiliary mixer to a thin consistency, is then spread and brushed over the surface and again rolled, this time with an 8-ton roller. The construction method here described is one of several types of construction that is possible with this product.

A Wide Market

Mr. Eckman's description in the November issue of CONCRETE goes into considerable detail in the matter of working procedure, but the foregoing description includes the high points. From this it will be seen that the logical field of application of this new temperature-resisting cement lies in the construction of secondary state and county highways and in the resurfacing of old city street pavements. Specifically, this type of construction may be put down on old concrete or brick pavements, on old gravel or macadam surfaces, or on any well-compacted road or street surface.

Well Adapted to Secondary Roads

The fact that this new form of cement-bound macadam may be placed on existing surfaces such as old gravel and macadam roads makes it especially well adapted to the resurfacing of such roads in county highway systems. The same is true of secondary roads in state highway systems, especially in cases where the aim of the highway department is that of maintaining the road in a highly serviceable condition in its old location, until such time as the road can be realigned and concreted.

Although many county highway departments have built the greater part of their systems in concrete, either single-lane or double-lane, the fact remains that this field has been held largely by asphalt and tar products.

Many Experimental Roads Built

Late in 1931 the Medusa Portland Cement Company built an experimental stretch of this new type of road, one-half mile long, at their plant at York, Penna. Since that time highway engineers have become interested, with the result that a half-mile stretch of road has been built in York County, Penna., by the Pennsylvania Department of Highways. In Massachusetts a strip 1,300 ft. long has been put down near Great Barrington, and another stretch of 1,000 ft. has been placed to a thickness of 2½ in. as resurfacing on an old concrete road; also, near Springfield, Mass., 2,000 ft. of 20-ft. road has been placed as covering over an old gravel road. In Rhode Island a short strip of 40-ft. road on the old Boston post road has been resurfaced where the concrete slab had settled because of a soft subgrade. In Wisconsin, near Cedarburg, a stretch of road 1⅓ miles in length has been built.

Development of the New Cement

The development of this new cement by Dr. Albert Sommer came about as a result of his experience in the resurfacing of water-bound macadam roads in Europe following the War. Prior to that time he had been engaged for ten years as research chemist for the Texas Company in the United States. Seeing the condition of the roads in France and Germany as a result of the heavy truck traffic to which they had been subjected, he organized companies to undertake their reconstruction. For several years his companies placed from 4,500 to 5,000 miles of resurfacing per year, the material consisting of bituminous coatings from 1 to 2 in. thick. In the meantime Dr. Sommer recognized the necessity of hard-wearing surface covering, one that could at the same time be built economically and which would have the advantage of low maintenance costs.

As a result of extensive laboratory and field research he developed the utility of this mixture of bitumen with portland cement, after which he induced a number of European cement manufacturers to produce it. The cement has been employed with the fullest success in the construction of more than 200 miles of cement-bound macadam in France, Germany, Switzerland, Italy, Czechoslovakia, and Finland. It is now in actual production at the Medusa plants at York, Penn., at Silica, Ohio, and at Manitowoc, Wis.

Missouri Improvement Program Lauded by Committee

The Missouri Portland Cement Co., St. Louis, Mo., has been cited by the Robertson Committee for Industrial Rehabilitation as having effected a profit-paying plant modernization.

Four modern grinding units have replaced twenty-six obsolete mills. As a result production capacity has been materially increased, quality has been improved, and cost per barrel reduced slightly more than 26 cents.

The share-the-work plan has also been adopted, the plant operating on a three-shift schedule, with twenty-six added employees at the Prospect Hill plant.

PERSONALS

Ernest Y. Bragger has been appointed in charge of sales of certain of its products by the Ferrocrete Cement Co., Inc., New York City, effective November 1. These products include Snowcrete white portland cement, waterproofed white portland cements, as well as colored portland cements and allied products.

Mr. Bragger has spent the last 25 years in the promotion and sale of white portland cement and similar products.

Roland T. Doane, former advertising and sales promotion manager of the Lehigh Portland Cement Co., at Chicago, has joined Taylor, Rogers & Bliss, Inc., as director of the dealer service division.

This organization specializes in market analysis and sales development in the building industry.

Ernest Ashton, formerly chief chemist for the Lehigh Portland Cement Company, Allentown, Penna., has been appointed chemical engineer for the Medusa Portland Cement Company, Cleveland, Ohio.

Cordon R. Van Aken, of Buffington, Ind., and former superintendent of the Universal Atlas plant there, has been appointed superintendent of waterworks and of the electric power and light plant by the city of Crown Point, Ind.

Harry M. Poole, of Des Moines, Ia., has been elected a director of the Pennsylvania-Dixie Cement Corp. He is chairman of the board of a local coal company and president of four other coal or material firms.

Low Thermal Expansion of Some Silicates

A ceramic body having the unusually low average coefficient of linear thermal expansion of 0.53×10^{-6} in the range of 0 deg. to 200 deg. C., reported by W. M. Cohn, has been investigated by R. F. Geller and Herbert Insley, of the U. S. Bureau of Standards, and their report has been published in a 46-page pamphlet as Research Paper No. 456, under the full title of "Thermal Expansion of Some Silicates of Elements in Group II of the Periodic System". The full report appeared also in the July (1932) issue of the Bureau of Standards *Journal of Research*.

It was found that the material reported by Mr. Cohn is composed essentially of the mineral cordierite. The investigation was amplified to include thermal expansion determinations for some compounds of other elements in Group II of the periodic system.

Low expansion is a characteristic of cordierite (the "stable" form of a compound having the approximate formula $2MgO.Al_2O_3.5SiO_2$). This form may be prepared by sintering a mixture of talc, clay, and corundum at 1,350 deg., although the time required is considerably shortened by heating at from 1,400 deg. to 1,425 deg. At temperatures above 1,425 deg. to 1,450 deg. decomposition of the cordierite will take place. It may be formed also by devitrification of a glass of the proper composition at temperatures above 950 deg. and below about 1,425 deg.

Zinc orthosilicate, celsian or barium feldspar, and beryl also appear worthy of further consideration by those interested in the development of bodies having low coefficients of thermal expansion.

Accident Prevention in California Quarrying Industry

The stone-quarrying industry of California, including rock-crushing, rock-dressing, and the manufacture of cement and lime, conducted its operations during the calendar year 1931 with 5,981,014 man-hours of labor. In connection with these operations 74 lost-time accidents occurred among the employees for each million man-hours during which the men worked. This accident rate was revealed by a study of reports which the United States Bureau of Mines received through co-operation with the quarry companies and the California Industrial Accident Commission. The rate for 1931 was about 4 per cent higher than the corresponding rate for the previous year.

Safety in Quarry Blasting

The August issue of *The Explosives Service Bulletin*, issued by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., contains an instructive article on the handling of explosives in quarry blasting, by Arthur LaMotte. The title of the article is "Safety in Quarry Blasting."

"Safety in quarry blasting," the author asserts, "can be assured in a large measure by following the directions of the explosives manufacturers, using ordinary common sense, and employing careful, intelligent men to supervise and take charge of quarry operations."

After again urging blasting foremen to read the instructions that are inserted in each case of explosives, the author takes up a detailed discussion of what should and should not be done in blasting operations.

Copies of this bulletin may be obtained on a request addressed to any of the offices of E. I. du Pont de Nemours & Co.

Workers Vote to Continue Wage Reduction for Relief

By vote of the employes' representatives of the Schenectady works of the General Electric Company, the 2 per cent deduction from wages in behalf of unemployment emergency relief will continue through the coming winter. The Works Council, made up of representatives of all the shop workers in the plant, took this action upon the expiration of the previous period for which the 2 per cent deduction instead of 1 per cent had been maintained. It was decided to continue the 2 per cent deductions until April 30, 1933, if necessary, and the company, concurring as before, will contribute dollar for dollar with the employes.

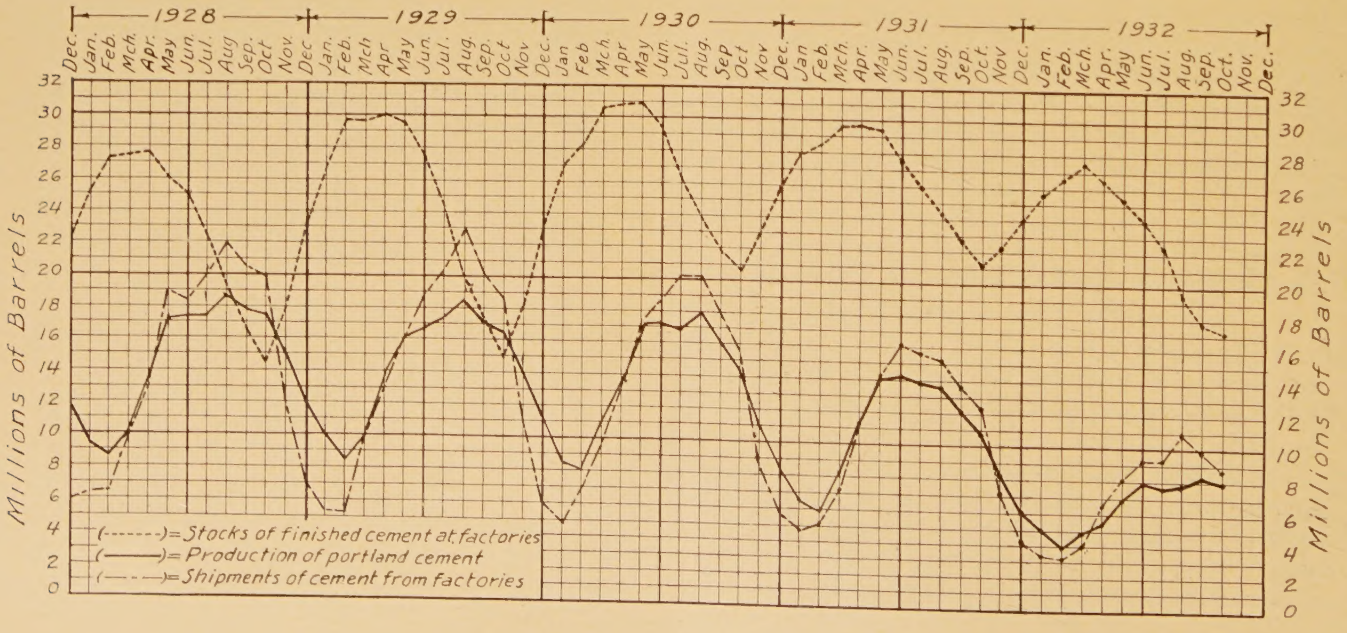
Cement Statistics for October

Relation of Production to Capacity

	The Month	Twelve Months
October, 1932	34.6	29.6
October, 1931	47.4	48.6
September, 1932	36.9	30.6
August, 1932	34.2	32.1
July, 1932	33.4	34.2

Production, Shipments and Stocks of Finished Portland Cement (In Barrels)

	1931	1932
Production, October	10,762,000	7,939,000
Shipments, October	12,360,000	8,743,000
Stocks at end of month	21,218,000	17,074,000
Production for year to date	110,435,000	65,778,000
Shipments for year to date	115,167,000	72,962,000



Design of New Grinding Unit for Closed-Circuit Application

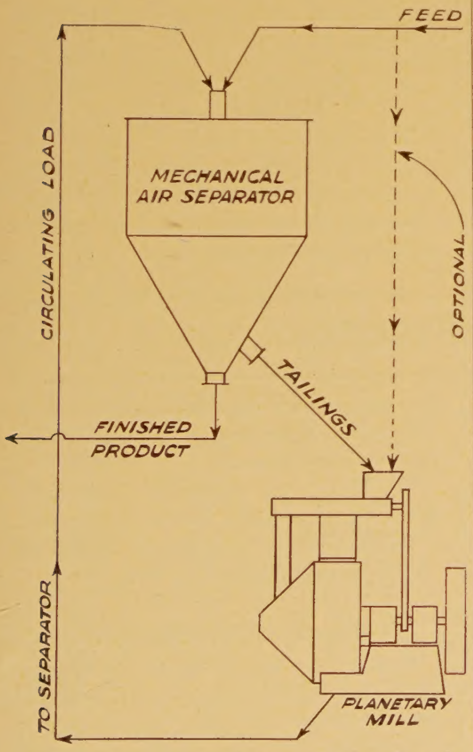
New Planetary Mill Is Departure from Customary Design—Suited as Adjunct to Mechanical Air Separator

A NEW planetary mill, designed as a specialized unit for closed-circuit operation in conjunction with a mechanical air separator, is announced by the Raymond Bros. Impact Pulverizer Co. of Chicago.

Its design is said to be a radical departure from conventional lines. The unit handles the raw material direct from the crusher and reduces it in one operation to the fineness required for the separator feed. Where the product contains a mixture of fine material, it is first passed through the separator, and the tailings discharged to the mill for regrinding. In this way, the available fines are removed without going through the mill.

If the product is too coarse, however, it is fed direct to the mill for preliminary pulverizing, then elevated to the separator for classifying, while the tailings are returned to the mill as before.

The planetary mill offers distinct advantages as a companion unit for the mechanical air separator, forming a combination outfit that shows substantial economies in production, according to the Raymond Bros. Co. It grinds to a medium degree of fineness, which permits large milling capacity with low power cost. At the same time, it produces a high percentage of fines that assures efficient operation of the separator without maintaining an excessive circulating load, it is stated.

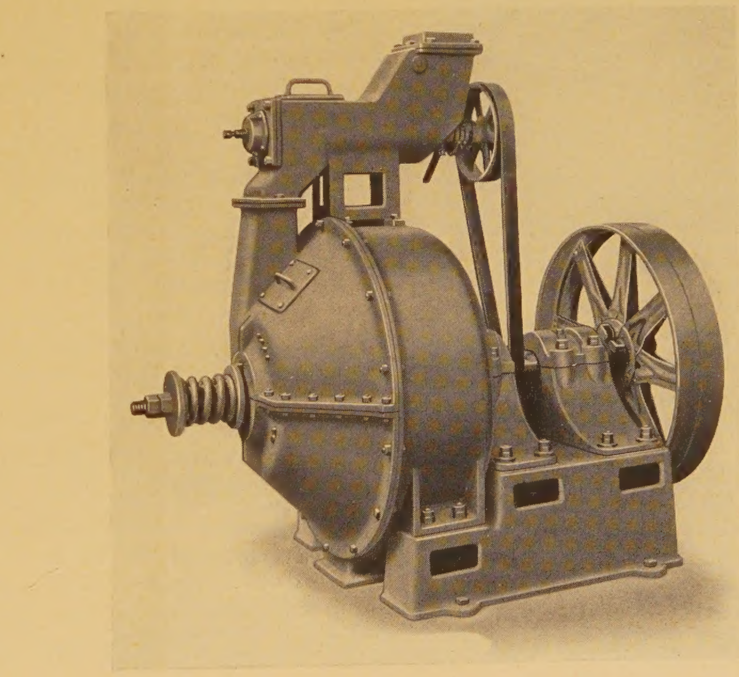


Flow sheet of planetary mill in closed-circuit arrangement with mechanical air separator, showing twi directions of feed

There is a further gain in economy due to the extreme simplicity. It is exceedingly compact, and can be easily installed in close quarters where it is to be operated in connection with a separator already in place. There are few parts in the whole assembly, and the wearing elements may readily be replaced.

The planetary mill operates on the ball and ring principle. The grinding ring revolves in a vertical plane, and is driven by the main shaft through a heavy iron spider. There are six large diameter free-rotating balls that move in the circular orbit formed by the grooved grinding ring. These balls, which are separated by a spacer, crush the material against the grinding ring by centrifugal force.

The balls are confined laterally by a pair of beveled discs, one on each side, which are held against the balls by the action of a heavy compression spring. The whole mechanism is enclosed in a cone-shaped casting that forms the grinding chamber. Easy access is provided by a hand-hole removable cover; or, the entire upper section of the casting may be removed.



Complete assembly of the planetary mill

The feed mechanism is mounted above the mill, and it consists of a screw type feed which is driven from the main shaft by a belt. The rate of feed may be regulated by the gate valve which varies the size of the opening at the bottom of the hopper. In addition, a shut-off slide is provided at the top of the hopper. A removable cover just above the screw gives access to the feeder.

The raw material, as well as the tailings from the separator, enters the hopper and is passed along by the screw feeder to the spout which discharges the material into the grinding chamber. It passes from the stationary cone to the revolving cone and is thrown by a plow into the grinding ring. As fast as the product is ground to required fineness, it is promptly discharged from the mill, preventing an accumulation of fines and keeping the balls free for grinding on the coarse material. As the product is discharged from the bottom of the mill it is elevated to the mechanical air separator, where the fines are removed to the finish bin, and the tailings returned to the mill.

The grinding pressure is maintained by the centrifugal action of the balls as they whirl in the grinding ring, and it is held constant at any given speed of the mill.

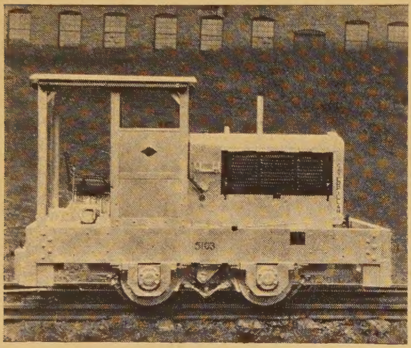
The simplicity of the operation results in high pulverizing efficiency and low power consumption, according to the Raymond Brothers company. The planetary mill is sturdily built throughout, reducing vibration and wear to a minimum.

Mill Equipment

Brookville Equips Locomotives with Caterpillar Engines

The Brookville Locomotive Co., of Brookville, Penna., are under full production on a complete series of industrial locomotives with "Caterpillar" engines. This series involves the use of three "Caterpillar" power plants, identical to engines used in their Models Twenty-Five, Thirty-Five and Fifty tractors.

The "BCL" Series are now available in 5, 6, 7, 8, 10 and 12 tons weight. They are supplied for all track gauges. Four operating speeds are offered in both forward and reverse work, with range of approximately 2 to 15 miles per hour. They are supplied standard for the use of gasoline as fuel, with kerosene or alcohol burning equipment optional. Distribution will be primarily through Caterpillar dealers, which will insure the after-sales service of these dealers.



Brookville Bulletin No. 500 fully illustrates and describes and will be supplied upon request.

Hansen Arc Welder Line Is Revised and Improved

Harnischfeger Corp., Milwaukee, Wis., have improved and revised their line of P&H Hansen arc welders.

A new magnetic bridge, and a unique short circuit winding have greatly extended the welding range, and further improved arc recovery and arc stability.

Single operator electric motor driven types of arc welders are produced in 100, 200, 300, 400, 600 and 800 ampere sizes. Variants in stationary and portable types are designed to operate on either alternating or direct current.

Up to 300 ampere size units have the motor and generator mounted as a single unit to form a compact two-bearing machine. The larger sizes are four bearing units, the generator and motor are direct coupled and mounted on a welded steel base.

Several types of welders are available, including "two-operator" units, gasoline engine driven stationary or portable units, beside a complete line of arc welders for every purpose.

These welders are described in a new catalog entitled "Weld It Well." Other material contained in this publication covers the latest developments in welding practice, as well as a direct illustrated comparison of old-time practice and modern welding methods.

Motor Reduction Unit for Low Speed Drives

Allis-Chalmers Manufacturing Co. announce the development of a motor reduction unit for use where low speed drives are required. A standard round frame type motor is mounted directly on the gear reducer housing, thus forming a compact unit. Helical gears are used to permit the highest possible efficiency and the most quiet operation.

INDUSTRIAL LITERATURE

Motor Selection

"Which Motors for Your Rock Products Plant?" is a recent publication of the *General Electric Co.*, Schenectady, N. Y. It contains applications of G-E motors and control on tube mills, auxiliaries, feeders, conveyors, and pulverizers.

Bailey Fluid Meter Bulletin

An attractive 24-page bulletin, *No.* 300, describing the new line of Bailey fluid meters now available, has been published by the *Bailey Meter Co.*, Cleveland, Ohio.

This bulletin describes and illustrates the several types of meters which can be furnished, pointing out the features which make the new line of meters outstanding. Other sections of the bulletin deal with the application and methods of installation of the equipment.

Numerous illustrations are included in the bulletin, comprising detailed drawings, diagrammatic sketches, equipment photographs, installation photographs, and chart reproductions in four colors.

Belting Booklet

"Lubricated with Rubber" is the title of a four-page booklet on its *Highflex* belting just issued by the *B. F. Goodrich Rubber Company*, Akron, Ohio, and now available on request to the manufacturer.

FIELD ACTIVITIES

Westinghouse Vice-Presidents

Following the meeting of the board of directors of the *Westinghouse Electric and Manufacturing Co.*, held in New York, *President F. A. Merrick* announced the election of two vice-presidents.

C. E. Stephens, formerly commercial vice-president, with headquarters in New York was elected vice-president. He will remain in New York.

N. G. Symonds, formerly commercial vice-president at Chicago was elected vice-president in charge of sales. His headquarters will be at the general offices of the company in East Pittsburgh.

Link-Belt Sales Manager

Announcement is made that *Link-Belt Co.* has recently appointed *George M. Sharer* sales manager of its eastern division, with headquarters in Philadelphia. In this capacity, he has direct supervision of sales of all of the company's offices in the Atlantic Coast states.

Mr. Sharer is a mechanical engineer of broad experience, and has been connected with Link-Belt in Philadelphia in various capacities for the past 32 years.

Leaves Worthington

Walter F. Perkins, who has been manager of the Harrison, New Jersey, works of the *Worthington Pump and Machinery Corp.* since 1927, has resigned to become vice-president and general manager of the *Bartlett Hayward Company*, Baltimore, Maryland, where he will assume his new duties December 1.

Mr. Perkins is succeeded as works manager at Harrison by *Hugh Benet*, who was formerly manager of Worthington's Holyoke, Massachusetts, works.